Sandhill Crane: Thermal Imagery Workflow

Imagery collection & conversion: Convert images to 8-bit jpg[a], extract metadata & shapefile[b]

[a]*With tool provided by Quantaero*
[b]*Github script #1 (R)*

Remove images outside survey[c] & removal of land-only images[d]

[c]*Clip shapefile with survey polygon (ArcPro)*
[d]*Github script #2, #3 (Python)*

Apply 2-SD contrast stretch[e]

[e]*Github script #4 (Python)*

Annotation path: Create tiles from parent images[f]

[f]*Github script #5 (Python)*

Split train/test data[g]; Train & test YOLO model[h]

[g]*Github script #6 (R)*
[h]*Github script #7 (Python)*

Apply inference on YOLO model[i]

[i]*Github script #8 (Python)*

Convert inference csv to Label-Studio json; import preliminary annotations into Label-Studio; export annotations in YOLO format[j]

[j]*Github script #9 (Python)*

After final model iteration, follow the Survey Count path (next slide)

All scripts provided in Github:
https://github.com/USFWS/AI-for-USFWS-Migratory-Birds/tree/main/Sandhill%20crane

Sandhill Crane: Survey Count Workflow

Run YOLO detection model inference on individual images[k]

[k]*Github script #8 (Python)*

For images with > 5 sandhill cranes predicted, orthorectify/ mosaic images[l]

[l]*PosPAC Post-processing of POS data, then Github script #10 (Linux)*

Run YOLO detection model inference on mosaics[m]

[m]*Github script #8 (Python)*

Plot spatial locations of sandhill cranes, ducks/geese[n]

[n]*Github script #11 (Python)*

Calculate near distances; remove all predicted birds > 50 m from nearest neighbor; manually review mosaics & remove extraneous data (i.e., predictions on land)[o]

[o]*Conducted in ArcPro*

Determine final counts